Name: Date:

Exam: Function Reflections (Solution version 606)

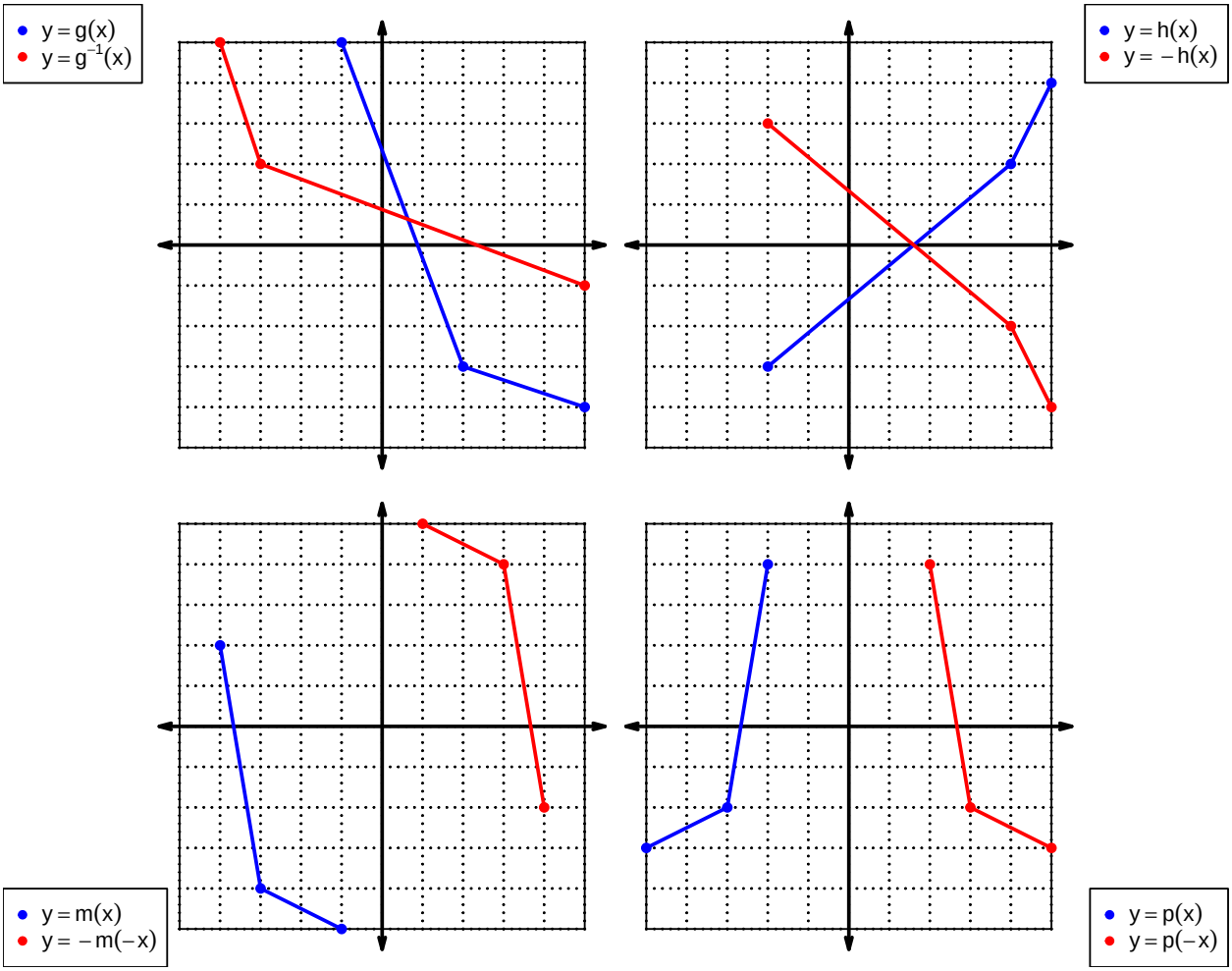
1. (worth 9 points) Let function f be defined by the polynomial below:

$$f(x) = -3x^5 - 4x^4 + 2x^3 - 9x^2 - 7x + 6$$

Draw lines that match each function reflection with its polynomial:

Reflections	Polynomials
$-f(-x)$	$-3x^5+4x^4+2x^3+9x^2-7x-6$
$-f(x)$	$3x^5+4x^4-2x^3+9x^2+7x-6$
$f(-x)$	$3x^5-4x^4-2x^3-9x^2+7x+6$

2. (worth 20 points) In each xy plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The x axis is horizontal and the y axis is vertical (as typical), and the scale is equal on both axes.



Exam: Function Reflections (Solution version 606)

For all questions on this page, the functions f, g, and h are defined by the table below.

x	$f(x)$	$g(x)$	$h(x)$
1	4	5	9
2	9	8	6
3	1	7	8
4	7	3	2
5	8	2	4
6	5	6	3
7	2	1	7
8	3	9	1
9	6	4	5

3. (worth 3 points) Evaluate $g(3)$.

$$g(3) = 7$$

4. (worth 3 points) Evaluate $f^{-1}(6)$.

$$f^{-1}(6) = 9$$

5. (worth 3 points) Assuming h is an **odd** function, evaluate $h(-4)$.

If function h is odd, then

$$h(-4) = -2$$

6. (worth 3 points) Assuming g is an **even** function, evaluate $g(-5)$.

If function g is even, then

$$g(-5) = 2$$

Exam: Function Reflections (Solution version 606)

7. (worth 15 points) A function, f, is **even** if $f(x) = f(-x)$ for all x in the domain. A function, g, is **odd** if $g(x) = -g(-x)$ for all x in the domain.
Let polynomial p be defined with the following equation:

$$p(x) \;=\; -x^2 + 1$$

a. Express $p(-x)$ as a polynomial in standard form.

$$p(-x) \;=\; -(-x)^2 + 1$$
$$p(-x) \;=\; -x^2 + 1$$

b. Express $-p(-x)$ as a polynomial in standard form.

$$-p(-x) \;=\; -\left(-x^2 + 1\right)$$
$$-p(-x) \;=\; x^2 - 1$$

c. Is polynomial p even, odd, or neither?

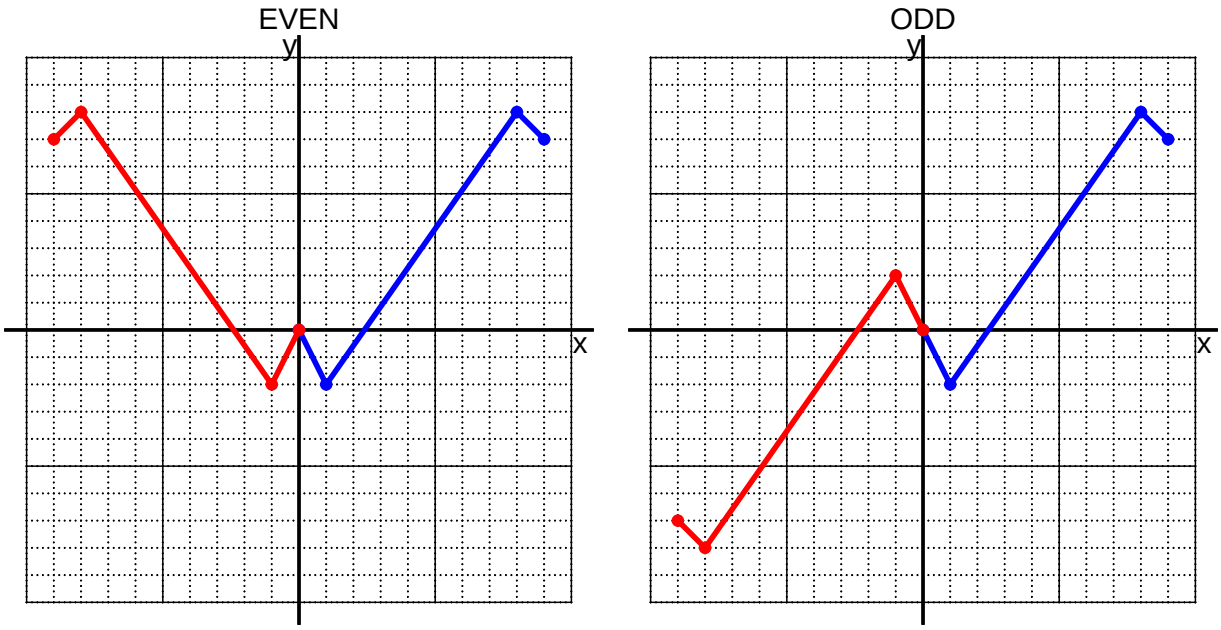
even

d. Explain how you know the answer to part c.

We see that $p(x) = p(-x)$ for all x because $p(x)$ and $p(-x)$ are equivalent polynomials. Thus function p satisfies the criterion for being an even function.

Exam: Function Reflections (Solution version 606)

8. (worth 10 points) I have drawn half of a function. Draw the other half to make it even or odd.



9. (worth 10 points) Let function f be defined with the equation below.

$$f(x) = 4(x-3)$$

a. Evaluate $f(22)$.

step 1: subtract 3
step 2: multiply by 4

$$f(22) = 4((22)-3)$$
$$f(22) = 76$$

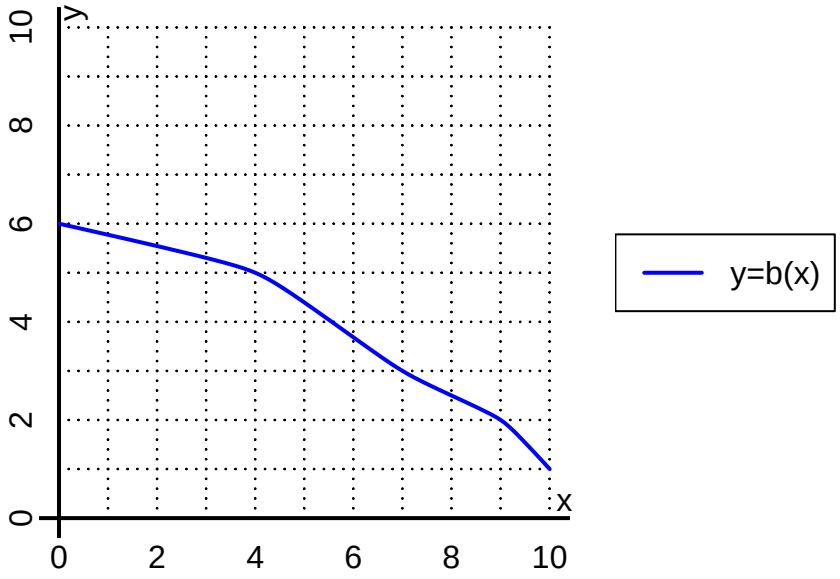
b. Evaluate $f^{-1}(8)$.

step 1: divide by 4
step 2: add 3

$$f^{-1}(x) = \frac{x}{4} + 3$$
$$f^{-1}(8) = \frac{(8)}{4} + 3$$
$$f^{-1}(8) = 5$$

Exam: Function Reflections (Solution version 606)

10. (worth 6 points) The function b is represented by the curve $y = b(x)$ graphed below.



a. Evaluate $b(4)$.

$b(4) = 5$

b. Evaluate $b^{-1}(2)$.

$b^{-1}(2) = 9$

Exam: Function Reflections (Solution version 606)

11. (worth 18 points) Function f is defined by the table below.

    a. Complete the columns for $-f(x)$ and $f(-x)$ and $-f(-x)$.

x	$f(x)$	$-f(x)$	$f(-x)$	$-f(-x)$
-2	-5	5	5	-5
-1	-6	6	-6	6
0	0	0	0	0
1	-6	6	-6	6
2	5	-5	-5	5

b. Is function f even, odd, or neither?

neither

c. How do you know the answer to part b?

Function f is neither because neither column $-f(-x)$ nor column $f(-x)$ matches column $f(x)$ exactly.